

JC01 Rec'd PCT/PTO 19 DEC 2000

ATTORNEY'S DOCKET NO  
ETZOLD ET AL-1 (PCT)

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

U S APPLICATION NO (if known, see 37 CFR 1.5)

09/719903

INTERNATIONAL APPLICATION NO  
PCT/DE99/01793

INTERNATIONAL FILING DATE  
JUNE 18, 1999

PRIORITY DATE CLAIMED  
JUNE 20, 1998

TITLE OF INVENTION

METHOD FOR PRODUCING A NON-WOVEN FIBRE FABRIC

APPLICANT(S) FOR DO/EO/US

STEFAN ETZOLD ET AL.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau)
  - b. ☐ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has **NOT** expired.
  - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

PCT/ISA/210 - Int'l. Search Report (English)  
2 Sheets of Drawings

APPLICATION NO (if known, see 37 CFR 1.51)

INTERNATIONAL APPLICATION NO  
PCT/DE99/01793

ATTORNEY'S DOCKET NO  
ETZOLD ET AL-1 PCT

☒ The following fees are submitted:

**Basic National Fee (37 CFR 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO.....\$860.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)  
.....\$690.00

Neither international preliminary examination fee paid (37 CFR 1.82) nor  
international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$1,000.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)  
and all claims satisfied provisions of PCT Article 33(2)-(4).....\$100

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$ 860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than 20 30  
months from the earliest claimed priority date (37 CFR 1.492(e))

Claims	Number Filed	Number Extra	Rate
Total Claims	24 - 20 =	- 4 -	X \$18.00
Independent Claims	1 - 3 =	- 0 -	X \$80.00
Multiple dependent claim(s) (if applicable)			+ \$270.00

\$ 72.00

\$

\$

**TOTAL OF ABOVE CALCULATIONS =**

\$ 932.00

Reduction by 1/2 for Small Entity status.

\$

**SUBTOTAL =**

\$ 932.00

Processing fee of \$130.00 for furnishing the English translation later than 20 30  
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =**

\$ 932.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be  
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

See cover sheet attached to  
assign  
\$ to be charged to Deposit Acct

**TOTAL FEES ENCLOSED =**

\$ 932.00

Amount to be:  
refunded

\$

charged


\$

Applicant claims Small Entity status.

- a. ☒ A check in the amount of \$932.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. 03-2468 in the amount of \$ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 03-2468. A duplicate copy of this sheet is enclosed.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

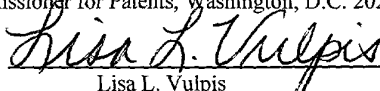
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1077 Northern Boulevard  
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(516) 365-9802

  
Signature

Edward R. Freedman  
Reg. No. 26,048

Express Mail No. **EL 769 423 011 US**  
Date of Deposit **December 19, 2000**

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10, on the date indicated above, and is addressed to the Ass't. Commissioner for Patents, Washington, D.C. 20231

  
Lisa L. Vulpis

09/719903  
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: STEFAN ETZOLD ET AL-1 (PCT)  
PCT No.: PCT/DE 99/01793 FILED: JUNE 18, 1999  
TITLE: PROCEDURE FOR CREATING A FLEECE MADE OF FIBERS

PRELIMINARY AMENDMENT

BOX PCT

Ass't. Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Preliminary to the initial Office Action, please amend the  
above-identified application as follows:

IN THE SPECIFICATION

Page 1, after last line, insert as new paragraph:

--In DE 34 16 004 A1, there is a prior-art process in which an unbonded fleece of thermoplastic fibers is fed to a calender roller arrangement, and the thermoplastic material is melted and displaced by pressure in the area of the holes by the calender roller arrangement. This produces a liquid bump at the edge of the holes to form a bonded grid to stabilize and fix the remaining fleece sheet. A hard melted edge is specifically created to reinforce the fleece sheet which is positive for the strength of the fleece sheet, but is disadvantageous due to the hardness of the melted edges.--

IN THE CLAIMS

Claim 4, line 1, delete "one of claims 1-3", and insert  
--claim 1--;

Claim 5, line 1, delete "claims 1-4", and insert --claim  
1--;

Claim 7, line 1, delete "one of claims 1-6", and insert  
--claim 1--;

Claim 10, line 1, delete "claims 7-9", and insert --claim 7-  
--;

Claim 12, line 1, delete "claims 7 and 8", and insert  
--claim 7--;

Claim 13, line 1, delete "one of claims 7-12", and insert  
--claim 7--;

Claim 14, line 1, delete "one of claims 7-12", and insert  
--claim 7--;

Claim 15, line 1, delete "one of claims 7-12", and insert  
--claim 7--;

Claim 16, line 1, delete "one of claims 7-15", and insert  
--claim 7--;

Claim 17, line 1, delete "one of claims 7-16", and insert  
--claim 7--;

Claim 18, line 1, delete "one of claims 7-16", and insert  
--claim 7--;

Claim 19, lines 1-2, delete "one of claims 1-18", and insert  
--claim 1--;

Claim 21, line 1, delete "or 20";

Claim 22, line 1, delete "one of claims 19-21", and insert  
--claim 19--;

Claim 23, line 1, delete "one of claims 19-22", and insert  
--claim 19--;

Claim 24, lines 1-2, delete "one of claims 1-23", and insert  
--claim 1--.

Please add the Abstract, attached hereto on a separate  
sheet.

REMARKS

By this Preliminary Amendment, a discussion of a prior art reference has been inserted into the specification. The multiple dependency of certain of the dependent claims has been removed so as to avoid the surcharge associated therewith. No new matter has been introduced. Entry of this amendment is respectfully requested.

Respectfully submitted,  
STEFAN ETZOLD ET AL

By: 

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ERF/11v

Enclosures: Abstract

EXPRESS MAIL NO. EL 769 423 011 US

Date of Deposit: December 19, 2000

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Lisa L. Vulpis

## ABSTRACT OF THE DISCLOSURE

Disclosed is a method for producing a non-woven fibre fabric comprising a plurality of perforated structures extending along the entire cross-section of said fabric. The inventive method consists of the following steps: in a first step, the matted fibres are placed on a belt screen to form a web of fibres; in a second step, the web of fibres is conveyed to a perforated-structure manufacturing unit, in a third step, the perforated structures are manufactured by mechanically impinging upon the fibres, whereby the mechanical impingement upon said fibres does not affect the mechanical and chemical structure thereof; and in a fourth step, the web of fibres provided with said perforated structures is compacted in a compaction unit for form a non-woven fabric.

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09/719903

JCC1 Rec'd PCT/PTO 19 DEC 2000

PROCEDURE FOR CREATING A FLEECE MADE OF FIBERS

The invention concerns a procedure to make a fleece consisting of fibers with numerous hole structures extending over the entire cross-section, and a fleece manufactured according to this procedure.

One-layer or multilayer fleeces with hole structures extending over the entire cross-section are e.g. used for coverstock materials for articles of hygiene such as sanitary napkins and diapers, or for other textile or technical uses. The hole structures serve to quickly drain bodily fluids, tissue components and feces into the liquid-absorbing material of diapers, sanitary napkins, etc. Depending on the application, the fleeces can be single-layer or multilayer, whereby multilayer fleeces can be bonded with other sheet media such as films.

There are several prior-art procedures to introduce hole structures into a one-layer or multilayer fleece, whereby the common element of the prior-art procedures is that the hole structures are created in the finished fleece after bonding and especially thermobonding.

For example, a prior-art procedure in EP 0 687 757 A2 introduces hole structures into the bonded fleece by passing the fleece between heated stamps that are pressed together to melt holes in the bonded fleece. A similar prior-art procedure, a hot-needle punching procedure, is in US 5 709 829.

The advantage of this procedure is that the bond of the fleece structure is held due to the melted edges that arise around the holes. A disadvantage is that the softness is negatively influenced by the relatively hard melted edges. A fleece obtained in this manner feels relatively hard and can be unpleasant to users.



In another prior-art procedure, the hole structures are created by (cold) stamping/cutting the fibers out of the bonded fleece. Such procedures have the advantage that hard stamped or melted edges do not arise, and materials obtained in this manner are soft. A disadvantage is that this procedure can only be done when the fleece is conveyed at a slow speed. In addition, the fibers are shortened along the holes which decreases the strength of the fleece.

A disadvantage of the cited procedures is that material is unnecessarily destroyed or wasted by hot and cold stamping or burning.

In another prior-art procedure in EP 0 214 608 A2, the fleece is manufactured and the hole structures are created by two rollers between which the fleece is guided. One roller has numerous heated needles, and the other roller has corresponding holes to receive the needles of the first roller. The needles purportedly displace the fibers while forming the hole structures and simultaneously form recesses around the hole structures, and they seal the edges of the hold structures by melting the fibers. In this procedure, the fibers are not shortened or destroyed, however hard melted edges arise that negatively influence the softness. In addition, it is involved and expensive to introduce hole structures after the fleece is thermobonded.

The problem of the invention is therefore to create a procedure that enables professionals to manufacture a fleece with hole structures that feels soft, the bond of the fibers is not weakened by introducing hole structures, the procedure can be done without waste, and it is simple and economical.

This problem is solved with a procedure of the initially-cited type that has the features of patent claim 1.

According to the invention, the fibers are randomly deposited on a screen belt to form a fibrous web in a first step of a procedure to create a fleece made of fibers with numerous hole structures extending over the entire cross-section of the fleece. In a second step, the fibrous web is transported to a hole-structure-creating machine; in a third step, the hole structures are created by mechanically displacing the fibers. The displacement of the fibers does not influence their mechanical and chemical structure. In a fourth step, the fibrous web with the hole structures is bonded in a bonding unit to form a fleece.

The invention is therefore based on the surprising knowledge that, to generate hole structures, it is sufficient to displace the fibers that cover the area of the holes to be formed and compress the fibers in this area and/or the neighboring area without having to destroy or impair the fibrous web in the area of the holes to be formed and/or its general appearance. In brief, the fibers of the fibrous web are reoriented in the area of the hole structures or diverted from their prior course in the procedure according to the invention before manufacturing the fleece by bonding and possibly thermobonding without requiring a heat treatment or simultaneous compression.

Suitable fibers or filaments for creating a fleece by the procedure according to the invention are any fibers or filaments suitable to form fleeces according to the various procedures, especially staple fibers, endless filaments, and bicomponent fibers and filaments. In particular, staple fibers are highly suitable.

It is particularly advantageous that no unnecessary waste or lost material arises, that the fibers are not shortened or destroyed in the area of the hole structures, and that the softness of the finished fleece is very good, and that

no additional hardening at the edge of the hole structures impairs the softness of the finished fleece.

Such a solution has not been pursued to date since in particular in a prior-art process in EP 0 214 608 A2 it is assumed that the fibers would tend to return to their original position after being displaced due to the return effect which would eliminate the created hole structures. It was surprisingly shown that this return effect is irrelevant in the procedure according to the invention.

Before the third step, the fibrous web can be bonded to one or more fleeces and/or with another sheet medium such as a film.

In addition, the danger of the fibers springing back can be advantageously countered by feeding the fibrous web directly to the bonding unit after creating the hole structure. In such a bonding unit, e.g. a calender roller arrangement, the fibrous web is compressed to create the finished fleece and, in an advantageous embodiment of the invention, it is simultaneously thermobonded. A very short path is desirable so that the hole structure is not lost while the fleece is being transported from the hole-structure-creating unit to the bonding unit.

In another advantageous embodiment of the invention, the fibrous web is prebonded before the third step so that the tensile strength of the prebonded fibrous web is 0.1 to 75 % and especially 50 % of the tensile strength of the bonded fleece.

The unbonded fibrous web is more-or-less held by a few widely-spaced bonding points or by applying pressure and/or heat. This provides a certain amount of mechanical stability to the fibrous web so that it can be transported

faster to the hole-structure-creating unit. The faster speed enables faster manufacturing.

In an advantageous embodiment of the procedure, the fibers surrounding the hole structures are fixed before feeding the fibrous web to the bonding unit. This serves to prevent the hole structures from stretching while transporting the fibrous web with the hole structures. Fixing the fibers, i.e., slightly adhering the fibers around the hole structure can be done with suitable means such as by applying heat and/or pressure to the fibrous web, e.g. by smooth rollers.

In addition, the fourth step can be carried out with the hole-structure-creating unit directly after the third step. In this case, the hole structure-creating unit is simultaneously used for bonding.

In a practical embodiment of the invention, the hole-structure-creating unit has two elements with facing surfaces between which the fibrous web is guided, whereby the surface of a first element has numerous barbs facing the fibrous web, and whereby the surface of a second element has openings in which the barbs of the first surface can at least partially enter, whereby the fibers of the fibrous web below the barbs are displaced without being destroyed when the barbs sink into the openings and the hole structures are formed.

In an advantageous embodiment of the invention, the openings of the second surface communicate with a source for a vacuum or pressure such as a blower so that fibers of the fibrous web in the area of the openings are sucked into or blown out of the openings. By sucking the fibers into the openings of the second surface, such a blower can support the nondestructive displacement of the fibers to form the hole structures, and the blower can blow the

fibrous web with the hole structures away from the second surface to gently prevent potential adhesion of the fibrous web to the second surface after creating the hole structures.

The channels and openings of the vacuum source can be shaped and dimensioned so that the fibers to be deformed or reoriented that are sucked into the openings and channels of the vacuum source are not caught.

In another advantageous embodiment of the invention, the first element is a roller. In practical embodiments of the invention, the roller has a diameter of 100 - 500 mm. Such a roller can be advantageous when a relatively fast production speed is to be attained.

In an alternate embodiment of the invention, the first element is a raising and lowering plate. Such a plate that can create discontinuous hole structures can be advantageous when the fibers are to be slowly and carefully displaced.

In practical embodiments of the invention, the barbs of the first element are conical or have an involuted shape or an ogival cross-section, whereby the barbs can have a practical height of 0.5 - 5 mm. Various shapes, sizes and heights of the barbs are used depending on the requirements of the fleece to be created that can be single-layer or multilayer fleece, e.g. a SMS fleece or a combination of fleece and other sheet media.

In another practical embodiment of the invention, the second element is a perforated belt. The fibrous web to be treated can be placed on such a perforated belt and transported to the first element where the barbs of the first element penetrate through the fibrous web into the holes of the perforated belt. Alternately, the second

element can be calender roller. A calender roller would also be used as the second element.

In another practical embodiment of the invention, a fleece created by the procedure according to the invention has hole structures with a diameter of 0.5 - 5 mm, the bonding surface is 3 - 40 % of the fleece surface, and the number of bonding points is 20 - 120 per square centimeter. Such a number of bonding points and a corresponding diameter of hole structures ensures a sufficient number of bonding points at the edge of the hole structures, and this fixes the hole structure so that the displaced filaments around the hole structures after hardening and thermobonding no longer return to their original position.

Other advantages and embodiments of the invention will be portrayed with reference to exemplary embodiments in the following description, the drawing, and in the patent claims. Shown in the drawing are:

Fig. 1 A schematic portrayal of a system for the procedure according to the invention,

Fig. 2 A detailed view of a hole-structure-creating unit of the system from Fig. 1,

Fig. 3 A top view of a hole structure of a fleece created by the procedure according to the invention, and

Fig. 4 An alternative embodiment of a system for the procedure according to the invention viewed from the side.

Fig. 1 shows a first embodiment of a system 10 for the procedure according to the invention. With a suitable and schematically portrayed device 12, a fibrous web 18 of fibers 14 is created and placed on a screen belt 16. As

indicated with the arrow A, a fibrous web 18 consisting of fibers 14 is transported to a hole-structure-creating unit 20. This hole-structure-creating unit 20 consists of a roller 22 whose outer surface 24 that forms the first surface 24 of the hole-structure creating unit 20 is above a perforated belt 26 with a surface 28 that faces the roller 22. This surface 28 forms the second surface 28 of the hole-structure creating unit 20.

The surface 24 of the roller 22 is provided with numerous barbs 30 that can at least partially enter the holes 32 in the perforated belt 26. As indicated by arrow B, the roller 22 rotates counterclockwise. Corresponding to the speed at which the perforated belt 26 is conveyed, the barbs 30 (of which only three are illustrated in Fig. 1 for the sake of simplification) continually penetrate the holes 32 and displace the filaments 14 of the fibrous web 18 at this site.

Under the perforated belt 26 is a vacuum/pressure source that will be discussed further below.

After the fibrous web 18 has passed through both surfaces 24, 28, the fibrous web 18 that now has hole structures 36 reaches a bonding unit 38. This bonding unit 38 consists of two calender rollers 40, 42 in the arrangement 10 in Fig. 1. The fibrous web 18 undergoes thermal bonding from the calender rollers 40, 42 so that the finished fleece 44 leaves the calender rollers 40, 42.

Fig. 2 shows details of the hole-structure-creating unit 20 on a much larger scale than Fig. 1. As indicated by arrow C, the vacuum/pressure source 34 generates a vacuum which sucks the filaments 14 of the fibrous web 18 over the hole 32 of the perforated belt 26 are sucked into the hole 32. This creates a sort of trough through which the barbs 30 of the roller 32 can more easily penetrate through the fibrous

web 18 into the holes 32 so that the filaments 14 of the fibrous web 18 are not destroyed but rather only displaced or reoriented in the area of the hole 32 to be formed.

To make it easier to remove the fibrous web 18 from the perforated belt 26 after the hole structure 36 is generated, it is possible to create pressure to lift the filaments that hang in a hole 32 of the perforated belt 26 so that the filaments 14 cannot contact the edge 46 of the hole 32 when the fibrous web 18 is lifted from the perforated belt 28.

Fig. 3 shows a detailed example of a hole structure 36 in a fleece 44 created by the procedure according to the invention. As can be seen, the fleece 44 has numerous bonding sites 48 created by the calender rollers 40, 42 that are evenly distributed over the entire surface of the fleece 44. By correspondingly adjusting the size, number and distribution of the bonding points, it is possible to provide the hole structure 36 with a sufficient number of bonding points at the edge 50 as well so that the bonding points 48 stabilize the hole structure 36.

Fig. 4 shows a partial area of a second embodiment of a system 10a for the procedure according to the invention. Here as well, the hole-structure-creating unit 20a has a roller 22 corresponding to the roller 22 in Fig. 1. The second surface 28a is the outer surface of the calender roller 40a. Correspondingly, the surface 28a of the calender roller 40a is provided with holes 32a that can be penetrated by barbs 30 of the roller 22. These holes 32a are also connected to a vacuum source (not shown).

The arrangement 10a shown in Fig. 4 makes it possible to dispense with the perforated belt 26 and shorten the transport path from the hole-structure-creating unit 20a to



the bonding unit 38a in contrast to the arrangement 10 in Fig. 1.

## CLAIMS

1. A procedure to create a fleece (44) made of fibers (14) with numerous hole structures (36) extending over the entire cross-section of the fleece (44), whereby:
  - in a first step, the fibers (14) are randomly placed on a perforated belt (16) to form a fibrous web (18),
  - in a second step, the fibrous web (18) is transported to a hole-structure-creating unit (20; 20a),
  - in a third step, the hole structures (36) are created by mechanically displacing the fibers (14), whereby the displacement of the fibers (14) does not influence their mechanical and chemical structure, and
  - in a fourth step, the fibrous web (18) with the hole structures (36) is bonded in a bonding unit (38; 38a) to form a fleece (44).
2. A procedure according to claim 1, characterized in that the fibrous web (18) is transformed by stiffening and thermobonding to form a fleece (44).
3. A procedure according claim 2, characterized in that before the third step, the fibrous web (18) is prebonded so that the tensile strength of the prebonded fibrous web (18) is 0.1 to 75 % and especially 50 % of the tensile strength of the bonded fleece (44).
4. A procedure according to one of claims 1-3, characterized in that the fibers (14) surrounding the

hole structures (36) are fixed before feeding the fibrous web (18) to the bonding unit (38; 38a).

5. A procedure according to claims 1-4, characterized in that the fibrous web (18) is fed directly to the bonding unit (38; 38a) after the hole structure (36) is created.
6. A procedure according to claim 5, characterized in that the fourth step directly follows the third step.
7. A procedure according to one of claims 1-6, characterized in that the hole-structure-creating unit (20; 20a) has two elements (22, 26; 40a) with facing surfaces (24, 28; 28a) between which the fibrous web (18) is guided, whereby the surface (24) of a first element (22) has numerous barbs (30) facing the fibrous web (18), and whereby the surface (28; 28a) of a second element (26; 40a) has openings (32, 32a) in which the barbs (30) of the first surface (24) can at least partially enter, whereby the fibers (14) of the fibrous web (18) below the barbs (30) are displaced without being destroyed when the barbs (30) sink into the openings (32; 32a) and the hole structures (36) are formed.
8. A procedure according to claim 7, characterized in that the openings (32; 32a) of the second surface (28; 28a) communicate with a vacuum source (34) such as a blower so that fibers (14) of the fibrous web (18) in the area of the openings (32; 32a) are sucked into the openings (32; 32a).
9. A procedure according to claim 7, characterized in that the openings (32; 32a) of the second surface (28; 28a) communicate with a pressure source (34) such as a blower so that fibers (14) of the fibrous web (18) in

the area of the openings (32; 32a) are blown out of the openings (32; 32a).

10. A procedure according to claims 7 - 9, characterized in that the first element (22) is a roller (22).
11. A procedure according to claim 10, characterized in that the roller (22) has a diameter of 100-500 mm.
12. A procedure according to claims 7 and 8, characterized in that the first element (22) is a lowering and raising plate.
13. A procedure according to one of claims 7-12, characterized in that the barbs (30) of the first element (22) are conical.
14. A procedure according to one of claims 7-12, characterized in that the barbs (30) have an involuted shaped.
15. A procedure according to one of claims 7-12, characterized in that the barbs (30) have an ogival cross-section.
16. A procedure according to one of claims 7-15, characterized in that the barbs are 0.5-5 mm high.
17. A procedure according to one of claims 7-16, characterized in that the second element (26) is a perforated belt (26).
18. A procedure according to one of claims 7-16, characterized in that the second element (40a) is a calender roller (40a).
19. A fleece (44) created according to a procedure in one

of claims 1-18, characterized in that the hole structures (36) have a diameter of 0.5-5 mm.

20. A fleece according to claim 19, characterized in that the bonding surface is 3-40 % of the fleece surface.
21. A fleece according to claim 19 or 20, characterized in that the number of bonding points (48) is 20-120 per square centimeter.
22. A fleece according to one of claims 19-21, characterized in that the shape of the hole structures (36) is noncircular.
23. A fleece according to one of claims 19-22, characterized in that the distance between individual hole structures (36) is irregular.
24. A fleece (44) manufactured according to one of claims 1-23, characterized in that the fibrous web (18) is bonded to at least one other sheet medium before creating the hole structures (36).

Fig. 1

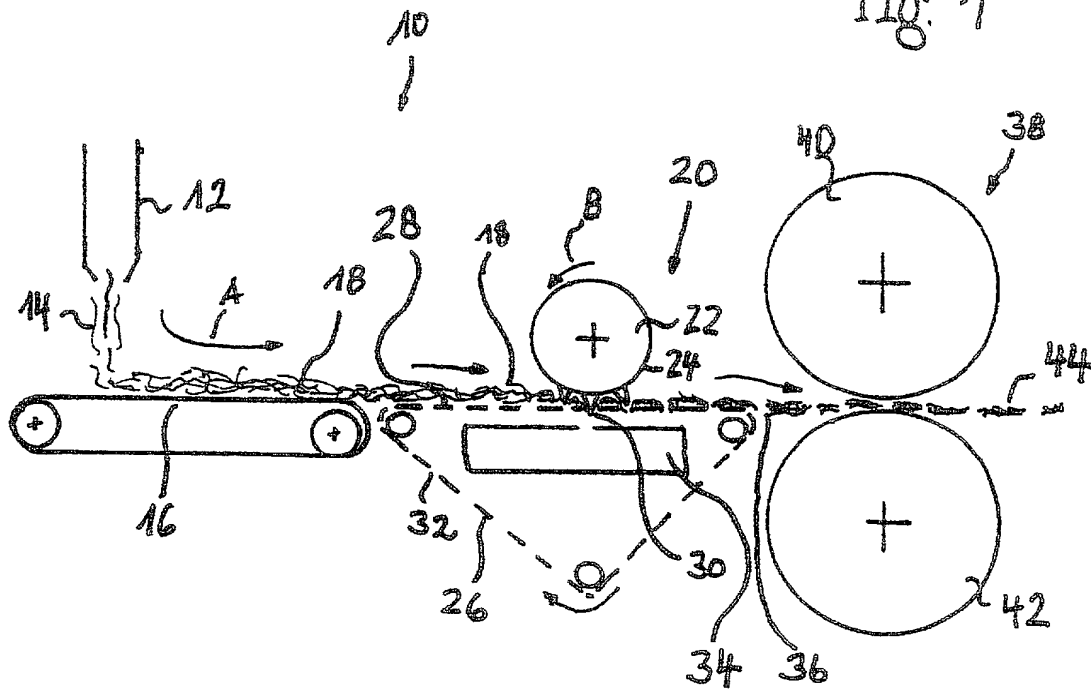
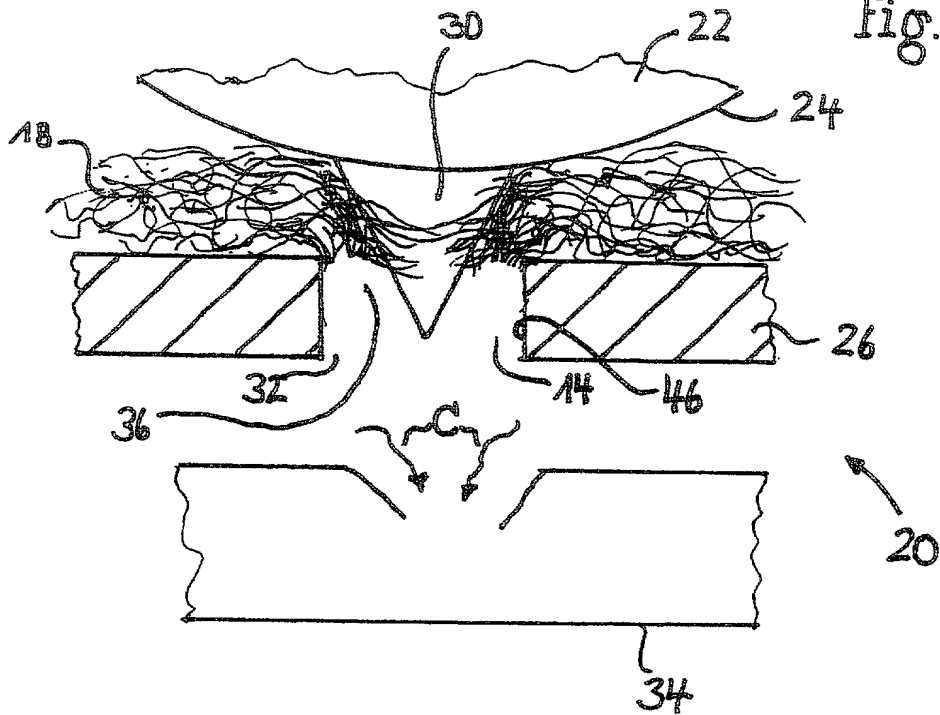
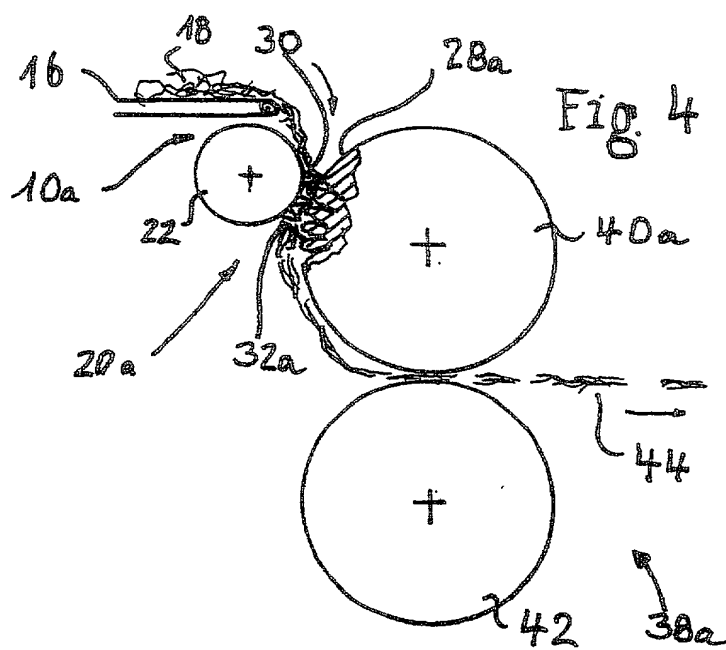
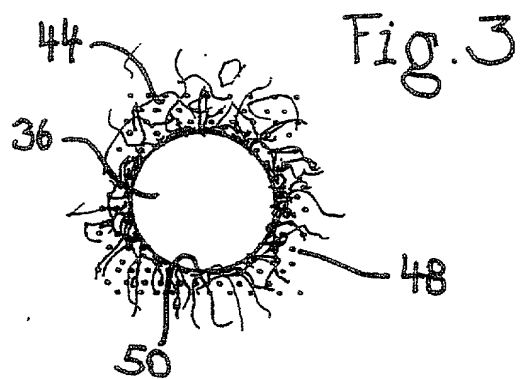


Fig. 2





**COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY**  
(Excludes Reference to PCT International Applications)**ATTORNEY'S DOCKET NUMBER**  
**ETZOLD ET AL-1 PCT**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**METHOD FOR PRODUCING A NON-WOVEN FIBRE FABRIC**

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No. \_\_\_\_\_

on \_\_\_\_\_

and was amended

on \_\_\_\_\_ (if applicable).

☒ was filed as PCT international application

Number PCT/DE99/01793

on 18 JUNE 1999

and was amended under PCT Article 19

on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

**PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:**

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
GERMANY	198 27 567.6	20 JUNE 1998	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO



COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY  
(Excludes Reference to PCT International Applications)ATTORNEY'S DOCKET NUMBER  
ETZOLD ET AL-1 PCT

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application Number)

(Filing Date)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a), which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR  
BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS			STATUS (Check One)		
U.S. APPLICATION NUMBER	U.S. FILING DATE		PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration numbers): KURT KELMAN, Registration No. 18,628.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201

S. Etzold

SIGNATURE OF INVENTOR 202

J. Bauer

DATE

8.12.00

DATE

06.12.2000